Control Sheet

Issue date	Revision number	Reason	Pages affected
08.15.2005	00	New release (FM4693)	All pages
11.10.2005	01	Corrections (FM4750)	All pages

CR-IR 357 Service Manual

Safety Precaution

1. Safety Precautions

Warnings and cautions regarding the procedures should be observed to avoid possible physical hazards and serious accidents that may occur during installation and servicing. Labels that describe relevant precautions are attached on the machine.
The instructions on such labels should also be observed during procedures.

1.1 General Precautions

■ Power Supply

Unless otherwise instructed in the Service Manual, be sure to turn OFF the power of the machine and unplug the power plug before servicing. With the power plug still plugged, you may experience electric shock, burn, or secondary damage due to short circuit even when the machine is powered OFF. It should be noted, however, that some servicing procedures, such as voltage measurement, cannot be performed under power-OFF condition. In such cases, use due care to avoid electric shock, burn, or secondary damage due to short circuit, as instructed in this manual.

■ Drive Mechanism

Be sure to turn OFF the power before servicing the gears, cams, belts, and other drive mechanism parts. Otherwise, your body or clothing may be entangled.
However, there may be cases where the procedures cannot be performed under power-OFF condition. In such cases, use due care to avoid entanglement of your hand, foot, hairs, and clothing with any rotating mechanism, as instructed in this manual.

■ Heavy Objects

Exercise due care regarding your working posture to avoid back pain during removal and installation of heavy objects.

■ Safety Devices

Safety devices (such as fuses, circuit breakers, panels, and covers) should always be enabled. Never attempt to make any alteration or modification that may impair their safety features.

■ Optical Parts

- ***When servicing the optical parts with the protective housings removed, be sure to turn OFF the power switch.***
- ***Never remove the scanning optics unit covers.***
- ***For dust removal procedures, observe the instructions described in the service manual.***
- ***Some high-voltage parts, such as the photomultiplier, may not be sufficiently discharged even after power is turned OFF. When servicing such parts, exercise due care to avoid electric shock hazards (not to touch the connector and terminal carelessly).***
- ***Before removing the protective housings, be sure to turn OFF the high-voltage switch (HV switch). If the machine is powered ON with any of the protective housings removed, the photomultiplier will be damaged.***

■ Handling Parts Containing Hazardous Substance

When handling parts containing a hazardous substance, such as the operation panel, the photomultiplier and the erasure lamp, fully exercise care in handling. The hazardous substance may leak from the inside of a broken part.

■ Other Working Precautions

- ***When performing servicing procedures with the protective housings removed under the powered condition, turn OFF the high-voltage switch (HV switch). Carefully proceed with the procedures while checking the instructions described in the service manual, and, when the procedures are completed, put the removed protective housings back exactly where they were.***
- ***Do not remove or install any part or component while the machine is powered, because of possible electric shock hazards.***
- ***When performing checks or adjustments under the powered condition, exercise due care against electric shock or other hazards.***
- ***Do not touch the parts (such as erasure lamps) that remain at high temperature because you may suffer burns.***
- ***When servicing the scanning optics unit and printed circuit boards, be sure to wear an antistatic wristband to remove static electricity built on the human body. Static electricity may cause damage to the printed circuit boards.***
- ***Secure the machine onto the floor in place by use of its adjustable feet or retainers.***
- ***Keep clean the product labels, safety standards labels, product serial number indications, and so forth attached on the machine, and do not peel them or put another label over them.***
- ***Before powering ON the machine after completion of the servicing procedures, make sure that all the parts, screws, connectors, and so forth that were removed have been reinstalled as appropriate, and that no tool is left in the machine.***

■ Grounding

Safety provided by grounding is assured by properly establishing power cable and additional protective ground wire connections and securing the parts with retaining screws. To maintain safety, ensure that the parts and retaining screws removed for servicing purposes are restored to states existing upon installation. After the parts and retaining screws are restored to the above-mentioned states, follow the procedures set forth in this service manual to verify that the retaining screws are securely tightened to properly secure the parts.

1.2 Precautions Against Laser Radiation

As indicated in the certification and indication label attached on the right-hand side cover of the machine, the machine complies with “Laser Products - Conformance with IEC 60825-1, Am. 2 and IEC 60601-2-22; Final Guidance for Industry and FDA (Laser Notice No. 50)” and “EN60825-1 (Amendment 2).” The image reader incorporates a laser with a maximum output of 50 mW (Class 3B, semiconductor laser wavelength of 660 nm, red visible light), but you will not be exposed to any hazard if you perform tasks as instructed in the service manual.

■ Precautions Against Laser Exposure

Observe the following precautions to avoid laser exposure.

- **Procedures that require precautions against laser exposure**

  When performing the following procedures, observe the instructions exactly as described in this manual to avoid laser exposure. After the procedures are completed, put the removed protective housings and screws back exactly in their original position to prevent leakage of a laser beam out of the machine.
  - Removal and reinstallation of the scanning optics unit.
  - Replacement and cleaning of subscanning unit parts.

- **Preventive maintenance for keeping the machine in compliance**

  In order to keep the machine in compliance, perform preventive maintenance programs described in "Preventive Maintenance Volume" at intervals specified.

- **Things that should not be done to avoid laser exposure**

  Observe the following precautions to avoid laser exposure.
  - Never attempt to perform procedures other than instructed in this manual because you may be exposed to laser beam radiation.
  - Do not reflect a laser beam by placing a mirror or the like in the laser beam path.
  - Do not alter the light path of a laser beam.
  - Do not replace optical parts while the laser is energized.
  - Do not attempt to make optical axis adjustment in the field. Although the semiconductor laser beam is red visible light, field adjustment of the optical axis cannot be done.

1.3 Precautions on Patient Environment

Before the machine is installed, the supervisor at the machine installation site (the hospital’s director) should check to see whether the machine is installed in the patient environment or not.

■ Additional Protective Grounding

If the CR-IR 357 is installed in the patient environment with the connected equipment in the non-medically used room, the additional protective grounding will be required.
Definitions of "patient environment", "medically-used room", and "non-medically used room" are given below.

- **Patient Environment**

  Patient environment is the area for the patient to receive medical procedures (treatment, tests, diagnosis, monitoring). It is the space measuring 2.5 m in all four directions and 2.5 m in height from the area of the patient’s body.
  It excludes the space traveled by the patient to reach the medically-used room.

- **Medically-Used Room**

  Room equipped with protective grounding (medical use outlet or medical use grounding terminal) implemented by the medical grounding method. The protective grounding inside the medically-used room is equipotential, and the protective grounding of this medically-used room is equipotential to that in the other medicallyused room. Generally, a portion of the medically-used room is the patient environment.

- **Non-Medically Used Room**

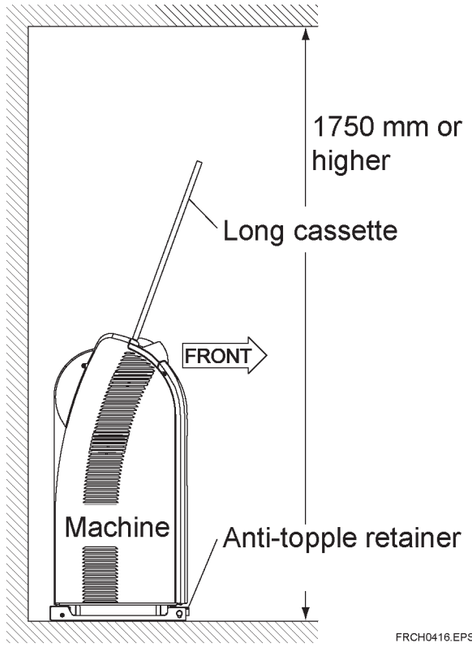
  Areas outside the medically-used room are considered the non-medically used room.

1.4 Precautions in Retaining the Machine

The installation space and the method of retaining the machine are limited in a site where a long cassette is used.

⚠ WARNING

Be sure to follow the precautions below in a site where a long cassette is used.
- ***Always fix the machine by an optional anti-topple retainer.***
- ***Install the machine in a space with a height of the ceiling of 1750 mm or higher.***



1.5 Notes on Supporter Use

When performing any procedure at an institution where the supporter (optional) is used, observe the following precaution.

⚠ CAUTION

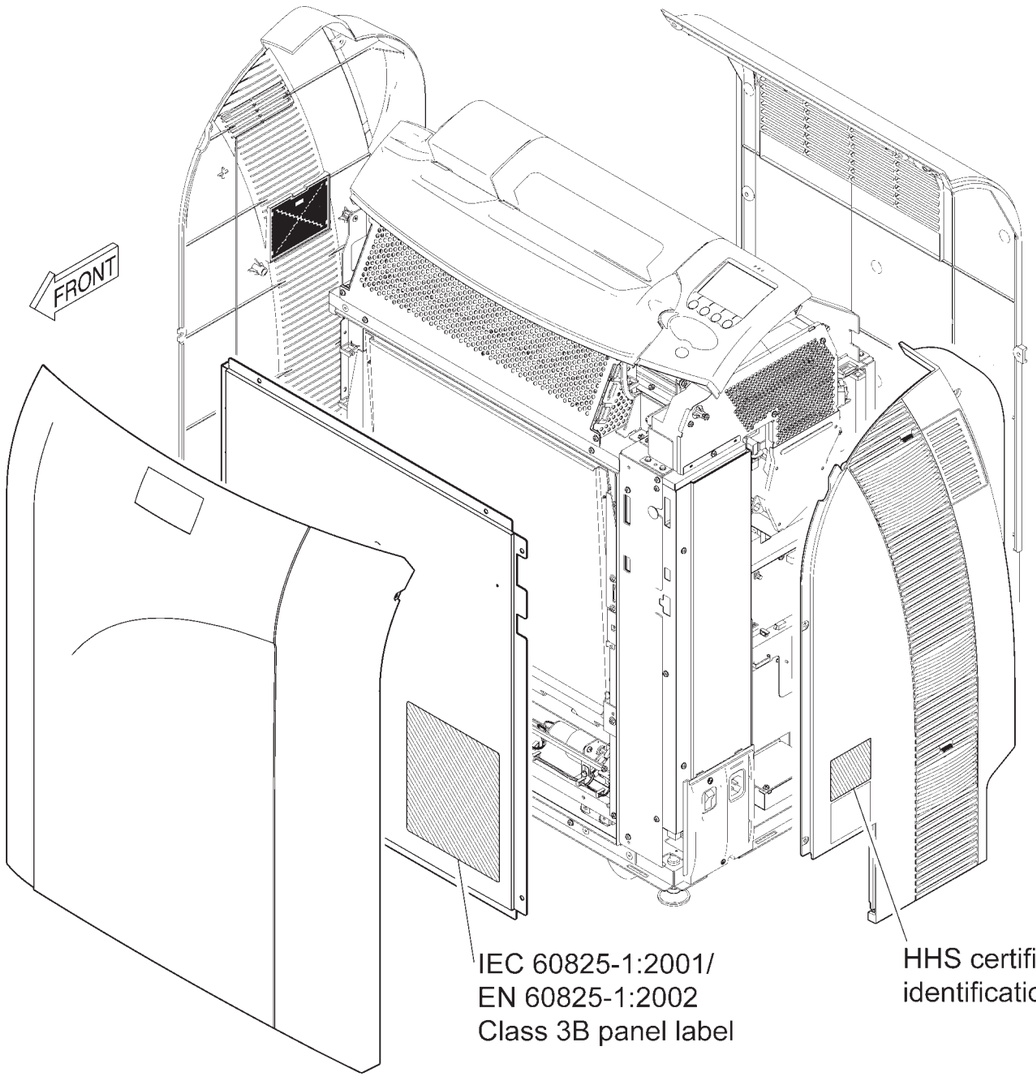
When pushing the machine into the supporter or pulling the machine out of the supporter, exercise care so that your fingers are not caught between the supporter and machine.

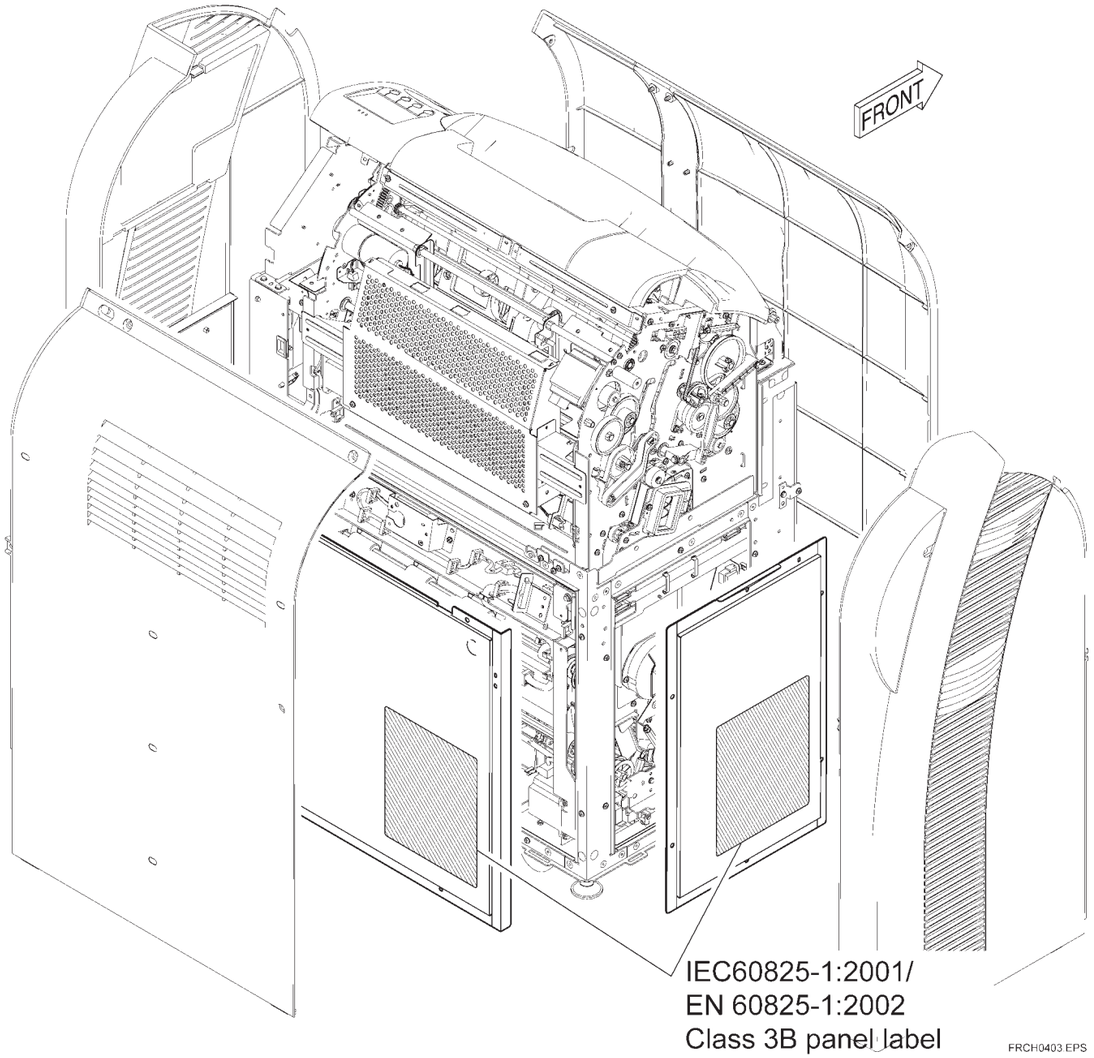
2. Labels

2.1 Laser Precaution Labels

2.1.1 Laser Precaution Label Attachment Locations

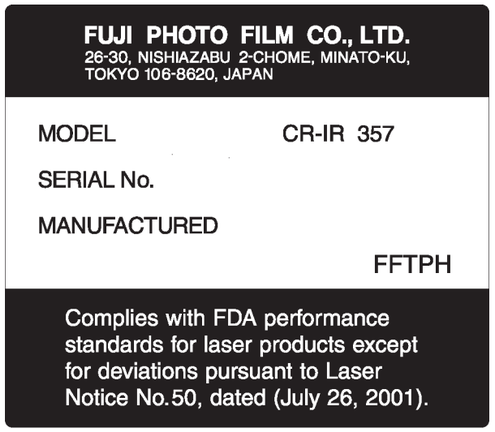
Below are illustrated the protective housings and attachment locations of laser precaution labels, as specified in "Laser Products - Conformance with IEC 60825-1, Am. 2 and IEC 60601-2-22; Final Guidance for Industry and FDA (Laser Notice No. 50)" and "EN60825-1 (Amendment 2).” issued by the FDA of the U.S.





2.1.2 List of Laser Precaution Labels

■ HHS Certification and Identification Label


FUJI PHOTO FILM CO., LTD.
26-30, NISHIAZABU 2-CHOME, MINATO-KU,
TOKYO 106-8620, JAPAN
MODEL CR-IR 357
SERIAL No.
MANUFACTURED
FFTPH
Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50, dated (July 26, 2001).

FRCH0417.EPS

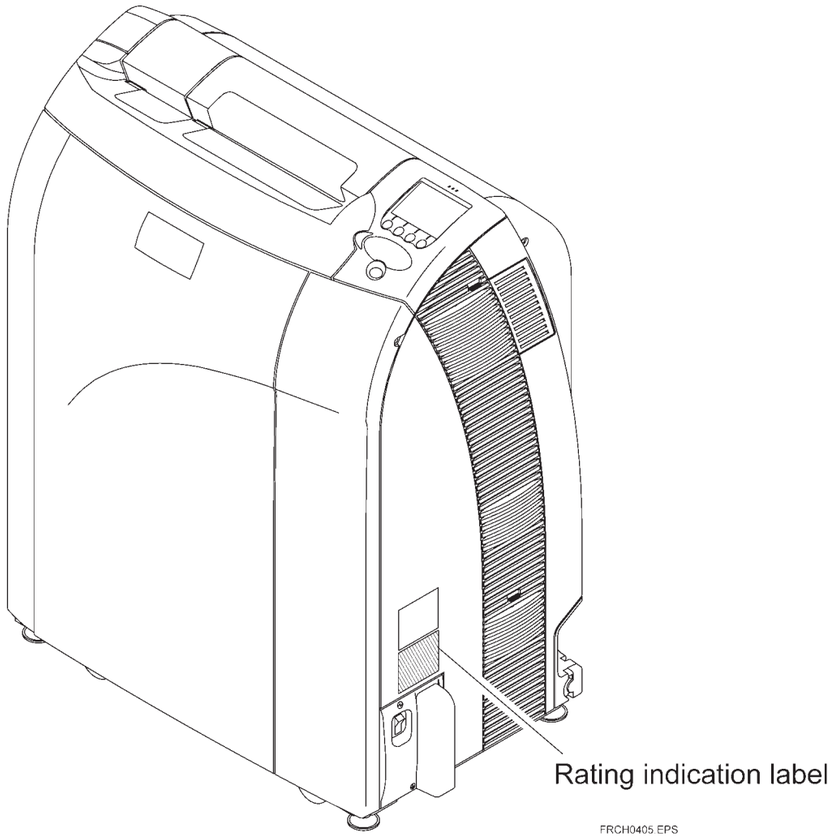
■ IEC60825-1:2001/EN60825-1:2002 Class 3B Panel Label

注意 — ここを開くとクラス3Bのレーザ光が出ます。ビームの被ばくを避けてください。
CAUTION — CLASS 3B LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO THE BEAM.
ATTENTION — RAYONNEMENT LASER DE CLASSE 3B EN OUVRANT ICI. EVITER L'EXPOSITION AU FAISCEAU.
VORSICHT — KLASSE 3B LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.
VOORZICHTIG — KLASSE 3B LASERSTRALEN INDIEN HIER GEOPEND. VERMIJD BLOOTSTELLING AAN LASERSTRALEN.
FORSIGTIG — KLASSE 3B LASERUDSTRÅLING NÅR AFSKÆRMNING ER ÅBEN. UNDGÅ BESTRÅLING FRA LASERSTRÅLEN.
OBSERVERA — KLASS 3B LASERSTRÅLNING OM ÖPPNAD HÄR. UNDVIK ATT UTSÄTTA DIG FÖR STRÅLEN.
ADVARSEL — KLASSE 3B LASERSTRÅLING UTGÅR HER HVIS ENHETEN ÅPNES. UNNGÅ EKSPONERING AV STRÅLEN.
HUOMAUTUS — LUOKAN 3B LASERSÄTEILYÄ LAITTEEN OLLESSA AUKI. VÄLTÄ ALTISTUMISTA LASERSÄTEELLE.
ATTENZIONE — RAGGIO LASER CLASSE 3B IN CASO DI APERTURA IN QUESTA POSIZIONE. NON ESPORSI AL RAGGIO.
ATENCION — RADIACION LASER DE CLASE 3B EN CASO DE ABRIR AQUI. EVITAR LA EXPOSICION A LOS RAYOS.
CUIDADO — EMITE RADIAÇÃO LASER DA CLASSE 3B QUANDO ABERTO AQUI. EVITE EXPOSIÇÃO AO RAIO.
ΠΡΟΣΟΧΗ — ΥΠΑΡΧΕΙ ΑΚΤΙΝΟΒΟΛΙΑ ΛΕΪΖΕΡ ΤΑΞΕΩΣ 3Β ΟΤΑΝ ΑΝΟΙΧΤΕΙ. ΑΠΟΦΥΓΕΤΕ ΤΗΝ ΕΚΘΕΣΗ ΣΤΗΝ ΑΚΤΙΝΑ ΤΟΥ ΛΕΪΖΕΡ.
주의 — 이곳을 열면 등급 3B의 레이저 광선이 나옵니다. 빔에 피폭되지 않도록 주의하여 주십시오.
注意 — 打开这里时，会发出 3B 级的激光。请务必避开以免受到激光扫射。
注意 — 打開時將發出3B級的激光。請避免激光束的照射。
זהירות — במקרה של פתיחה קרינה רדיו אקטיבית בדרגה של 3B. אנא המנע מחשיפה לקרינה.
ОПАСНО — ПРИ ОТКРЫТИИ В ДАННОМ МЕСТЕ ПРОИСХОДИТ ВЫБРОС ЛАЗЕРНОГО ИЗЛУЧЕНИЯ КЛАССА 3В. ИЗБЕГАЙТЕ ЛУЧЕВОГО ОБЛУЧЕНИЯ.
DİKKAT — BURAYI ACINCA 3B SINIFI LAZER RADYASYONU YAYILABİLİR, LAZERİN IŞINLARINDAN UZAK DURUN.
POZOR — PO OTEVŘENÍ HROZÍ NEBEZPEČÍ VYZAŘOVÁNÍ RADIACE TŘÍDY 3B VYHNĚTE SE OZÁŘENÍ PAPRSKEM.
FIGYELEM — 3B ERŐSSÉGŰ LÉZERSUGÁRZÁS KELETKEZIK NYITÁSKOR. A SUGÁRNYALÁB MEGKÖZELITÉSE/KÖZELI VIZSGÁLATA/KERÜLENDŐ.
UWAGA — PROMIENIOWANIE LASEROWE KLASY 3B PO OTWARCIU. UNIKAĆ WIĄZKI LASEROWEJ.
คำเตือน — เมื่อเปิดที่นี่ รังสีเลเซอร์ระดับ 3Bจะฉายออกมา ไปรดระวังการไดนรังสี
PERHATIAN — JIKA DIBUKA AKAN TERPANCAR RADIASI LASER KELAS 3B. HINDARKAN TERKENA PANCARAN SINAR.
CHÚ Ý — KHI MỞ CHỖ NÀY RA, TIA LA-DE HẠNG 3B SẼ PHÁT RA. HÃY TRÁNH BỊ TIA SÁNG CHIẾU VÀO.

FRCH0415.EPS

2.2 Ratings Indication Labels

■ Attachment Position



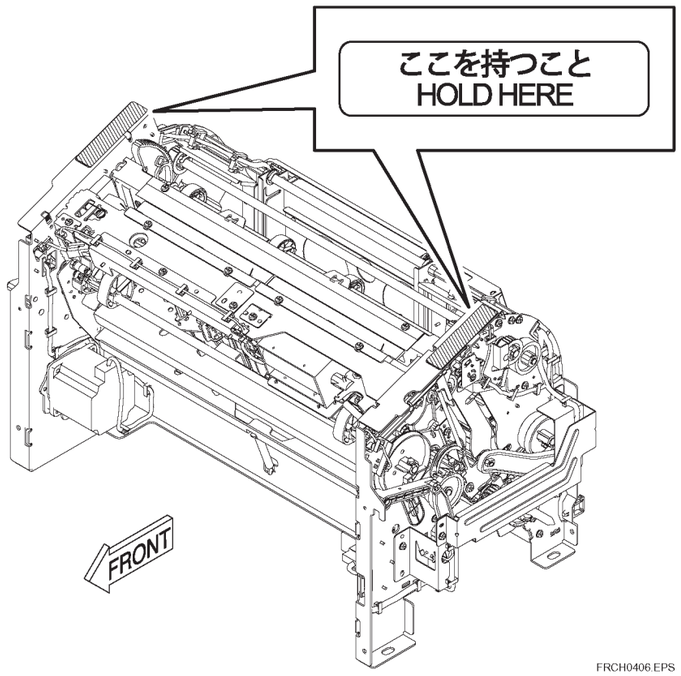
FRCH0405.EPS

■ Ratings Indication Labels

FRCH0429.EPS

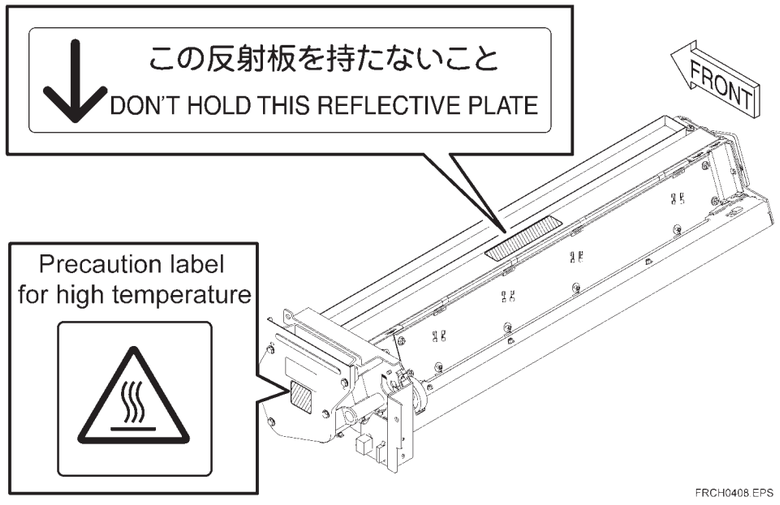
2.3 Handling Instruction Labels and Attachment Locations

2.3.1 Cassette Set Unit



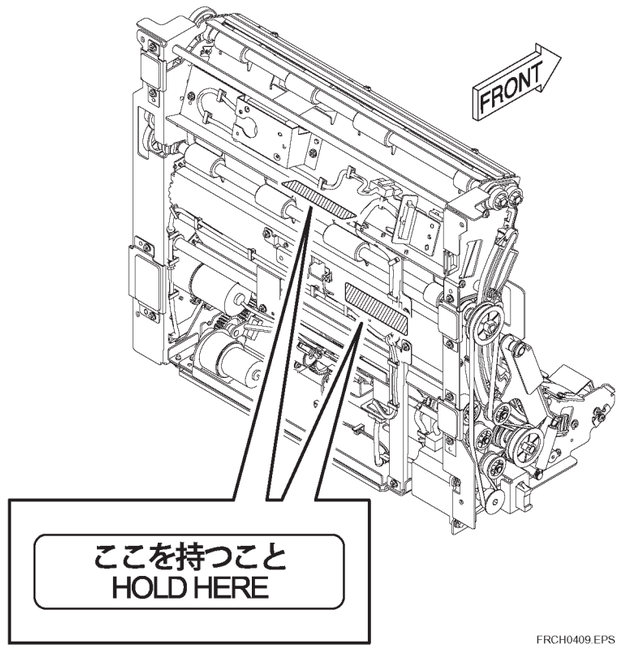
FRCH0406.EPS

2.3.2 Erasure Unit



FRCH0408.EPS

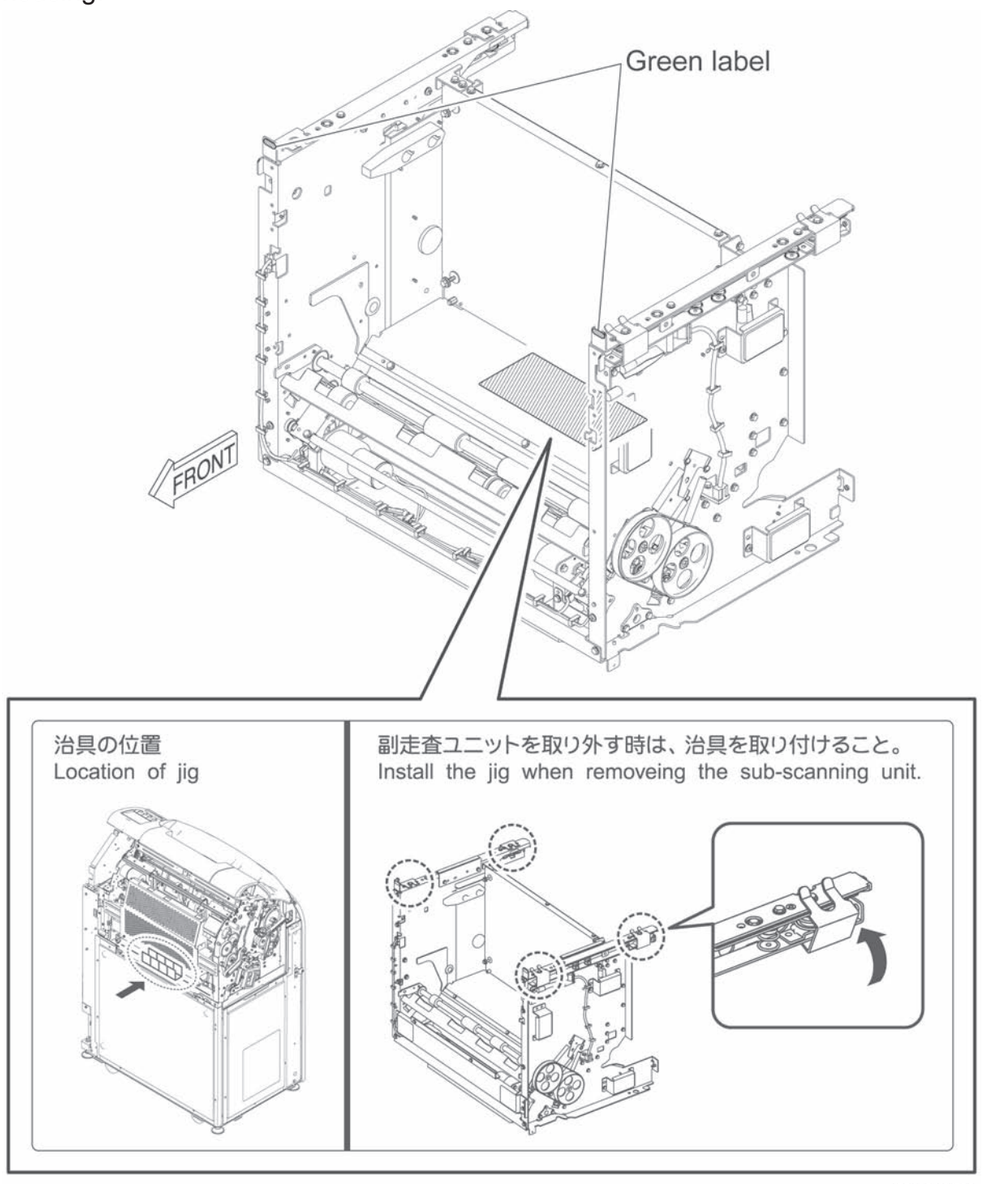
2.3.3 Side-Positioning Conveyor Unit



FRCH0409.EPS

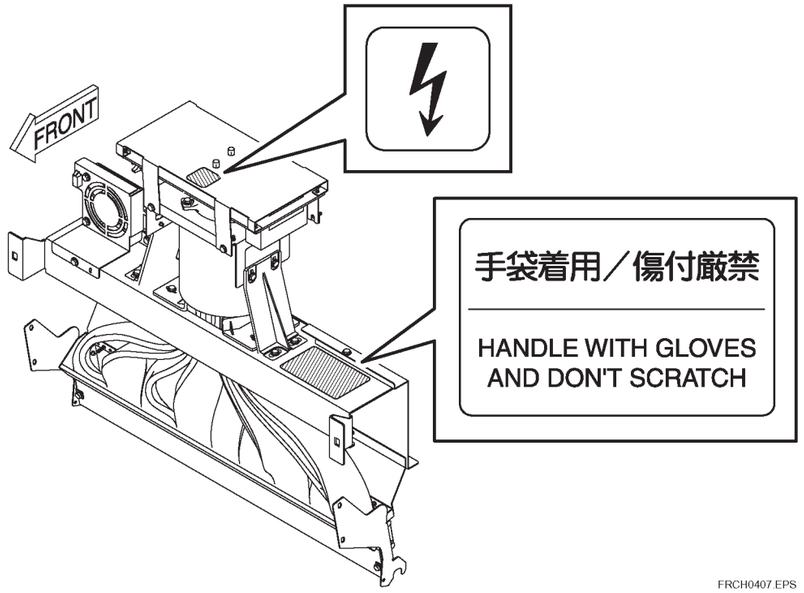
2.3.4 Subscanning Unit

Hold the portions of the green labels to dismount/mount the subscanning unit from/on the housing.



FRCH0410.EPS

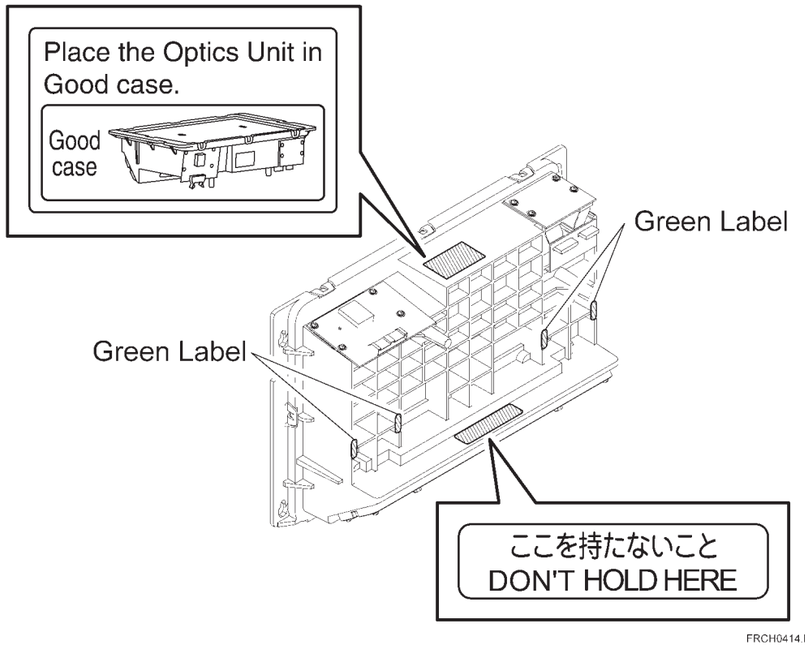
2.3.5 Light-Collecting Guide



FRCH0407.EPS

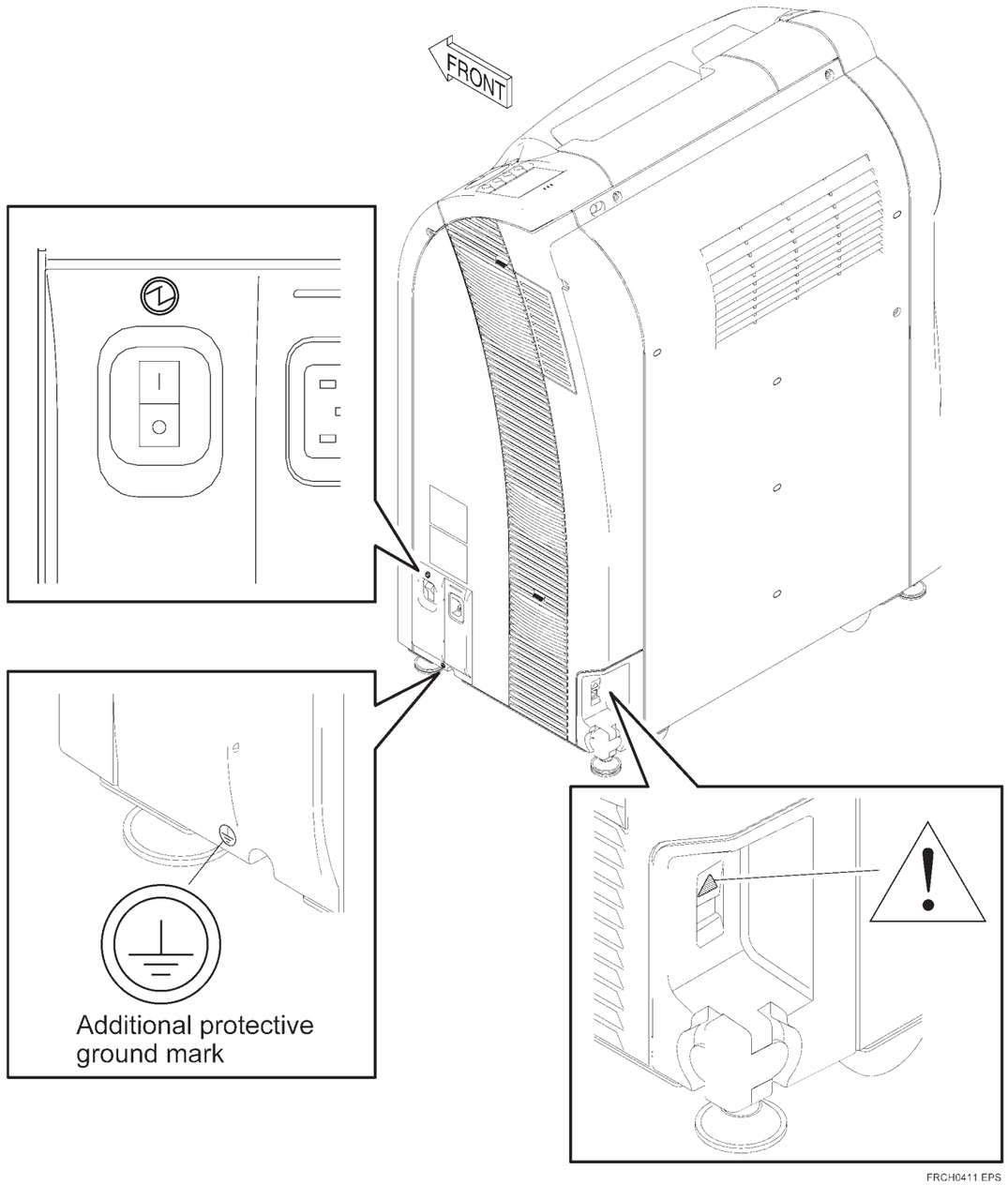
2.3.6 Scanning Optics Unit

Hold the portions of the green labels to dismount/mount the scanning optics unit.



FRCH0414.EPS

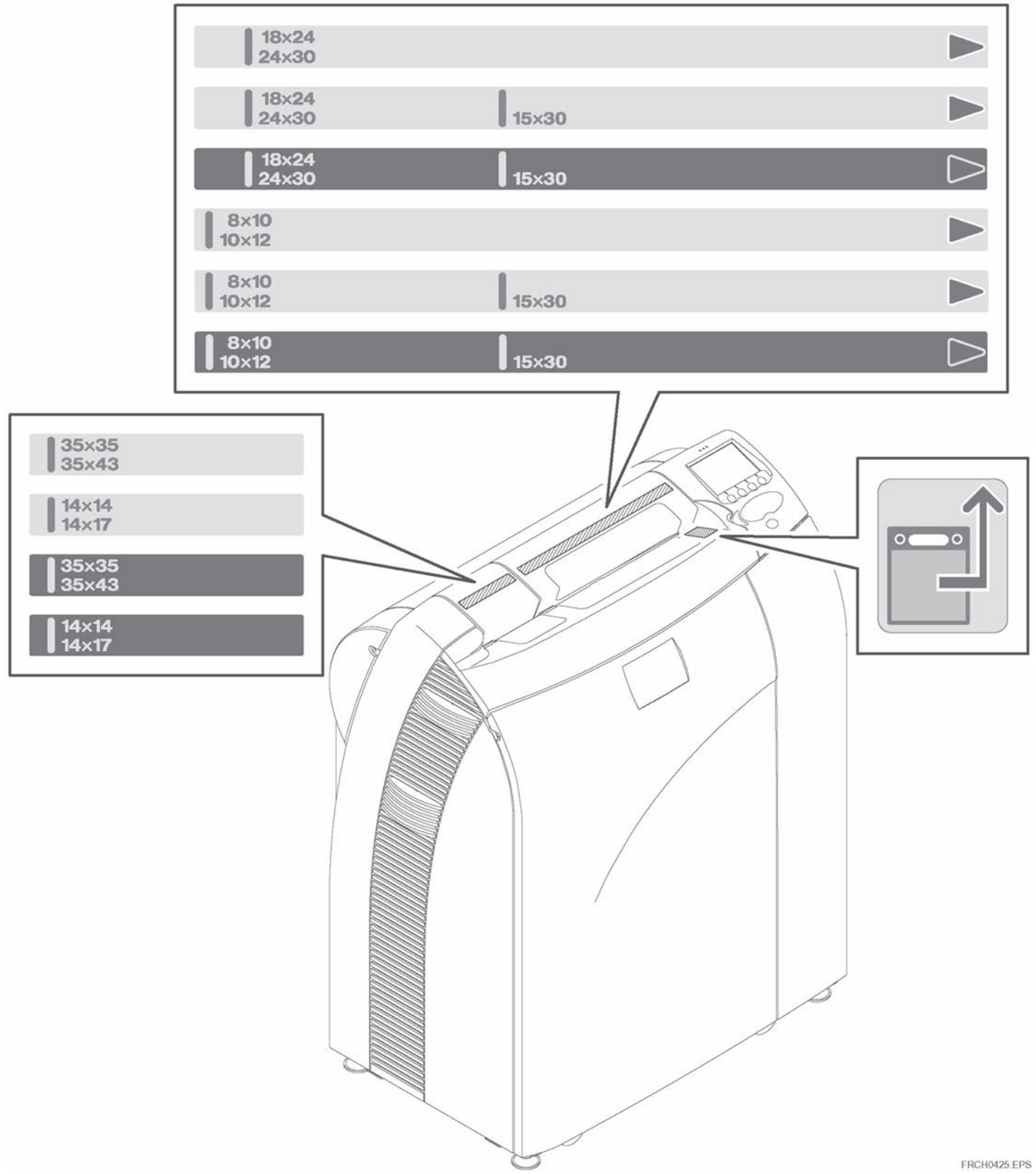
2.3.7 Covers



FRCH0411.EPS

2.3.8 Cassette Insertion Operation Label, Cassette Right-Justifying Label

The cassette insertion operation label differs depending on the type of the cassette used in the user's site.



FRCH0425.EPS

2.3.9 Lead Precaution Label

Apply the lead precaution label suitable for the local language.

撮影マーカーなどは外してカセッテを挿入してください。

ANTES DE INSERIR O CASSETE, CERTIFIQUE-SE DE REMOVER TODOS OS MARCADORES DE EXPOSIÇÃO UTILIZADOS PARA A EXPOSIÇÃO.

MAKE SURE TO REMOVE ALL EXPOSURE MARKERS USED AT THE TIME OF EXPOSURE BEFORE INSERTING THE CASSETTE.

ZORG ERVOOR DAT ALLE BIJ DE BELICHTING GEBRUIKTE BELICHTINGSMARKERINGEN VERWIJDERD ZIJN VOOR DE CASSETTE WORDT INGEBRACHT.

ACHTEN SIE BITTE DARAUF, VOR EINSCHIEBEN DER KASSETTE ALLE BEI DER BELICHTUNG VERWENDETEN BELICHTUNGSMARKIERUNGEN ZU ENTFERNEN.

ΣΙΓΟΥΡΕΥΤΕΙΤΕ ΟΤΙ ΑΦΑΙΡΕΣΑΤΕ ΟΛΟΥΣ ΤΟΥΣ ΔΕΙΚΤΕΣ ΕΚΘΕΣΗΣ ΠΟΥ ΧΡΗΣΙΜΟΠΟΙΗΘΗΚΑΝ ΚΑΤΑ ΤΗΝ ΔΙΑΡΚΕΙΑ ΤΗΣ ΕΚΘΕΣΗΣ ΠΡΟΤΟΥ ΠΑΡΕΜΒΑΛΛΕΤΕ ΤΗΝ ΚΑΣΕΤΑ.

S'ASSURER QUE LES REPÈRES D'EXPOSITION SONT BIEN ENLEVÉS AVANT D'INTRODUIRE LA CASSETTE.

ПЕРЕД ТЕМ, КАК ВСТАВИТЬ КАССЕТУ, ОБЯЗАТЕЛЬНО УДАЛИТЕ С НЕЕ ВСЕ ОТМЕТКИ, НАКЛЕЕНЫЕ ВО ВРЕМЯ СЬЕМКИ.

ASSICURARSI CHE SIANO RIMOSSI TUTTI I MARCATORI DI ESPOSIZIONE USATI AL MOMENTO DELL' ESPOSIZIONE PRIMA DI INSERIRE LA CASSETTA.

PŘED VLOŽENÍM KAZETY ODSTRAŇTE Z NÍ VŠECHNY EXPOZIČNÍ ŠTÍTKY.

ASEGÚRESE DE QUITAR TODAS LAS MARCAS DE EXPOSICIÓN UTILIZADAS PARA LA EXPOSICIÓN ANTES DE INSERTAR EL CASETE.

PRZED WŁOZENIEM KASETY USUN WSZYSTKIE OZNACZENIA POMOCNICZE UŻYWANE PODCZAS EKSPOZYCJI.

TILLSE ATT ALLA EXPONERINGSMÄRKEN SOM ANVÄNTS VID EXPONERING ÄR AVLÄGSNADE INNAN DU SÄTTER IN KASSETTEN.

A KAZETTA BEHELYEZÉSE ELŐTT A KAZETTA HÁTOLDALÁN TALÁLHATÓ EXPOZICIÓS PARAMÉTEREK JELZÉSEIT FELTÉTLENÜL TÁVOLITSA EL.

SØRG FOR AT FJERNE ALLE EKSPONERINGSMARKERINGER, ANVENDT VED EKSPONERING, FØR KASSETTEN SÆTTES I.

ודא להסיר כל תווי צילום לפני הכנסת הקלטת

PASS PÅ Å FJERNE ALLE EKSPONERINGSANVISERE SOM ER BRUKT VED EKSPONERINGEN FØR KASSETTEN ISETTES.

กรุณาเอาเครื่องหมายคำแสดงต่าง ๆออกจากคาสเซ็ทให้เรียบร้อย ก่อนที่จะใส่คาสเซ็ท

촬영마커 등은 벗겨내고 카세트를 투입하여 주십시오.

HÃY LỘT BỎ MIẾNG GIẤY GHI NHỮNG CHI TIẾT CŨ KHỎI CASSETTE RỒI HÃY CHO VÀO.

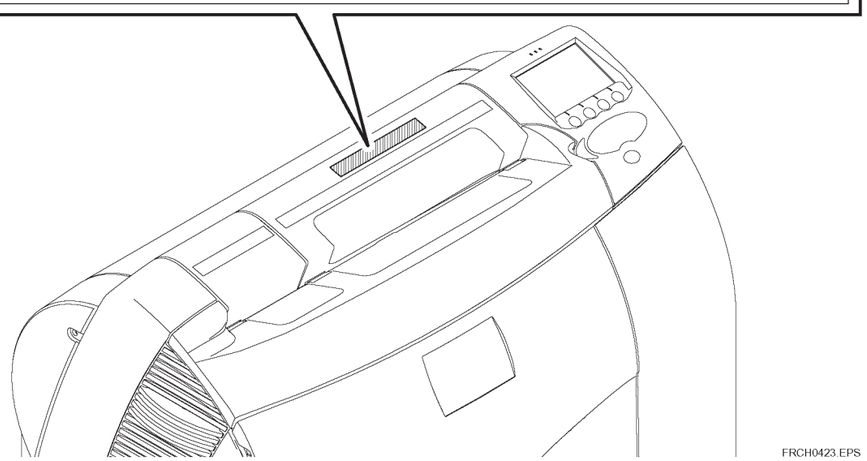
請在取下攝影標記等之後插入暗盒。

PASTIKAN BAHWA SELURUH MARKER YANG DIGUNAKAN SAAT PENYINARAN SUDAH DILEPAS SEBELUM MEMASUKKAN KASET.

请在取下摄影标记等之后插入暗盒。

KASETİ TAKIMADAN ÖNCE CEKİM ESNASINDA KULLANILAN BÜTÜN İŞARETLERİ KALDIRNIZ.

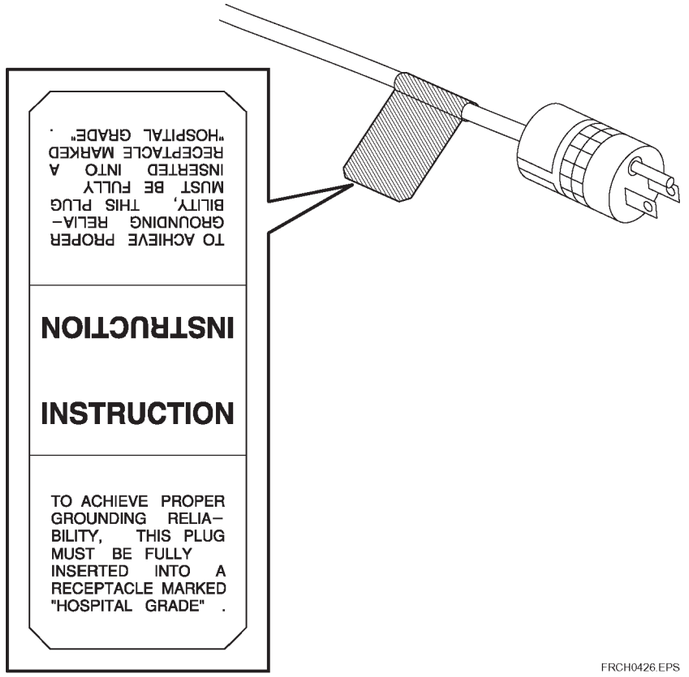
VALOTUKSEN AIKANA KÄYTETYT VALOTUSMERKIT ON EHDOTTOMASTI POISTETTAVA ENNEN KASETIN ASETTAMISTA.



FRCH0423.EPS

2.3.10 Power Cable Caution Label

Power Cable Caution Label (Only Hospital Grade Power Cable for U.S.A.)


INSTRUCTION
INSTRUCTION
TO ACHIEVE PROPER GROUNDING RELIA– BILITY, THIS PLUG MUST BE FULLY INSERTED INTO A RECEPTACLE MARKED "HOSPITAL GRADE" .
TO ACHIEVE PROPER GROUNDING RELIA– BILITY, THIS PLUG MUST BE FULLY INSERTED INTO A RECEPTACLE MARKED "HOSPITAL GRADE" .

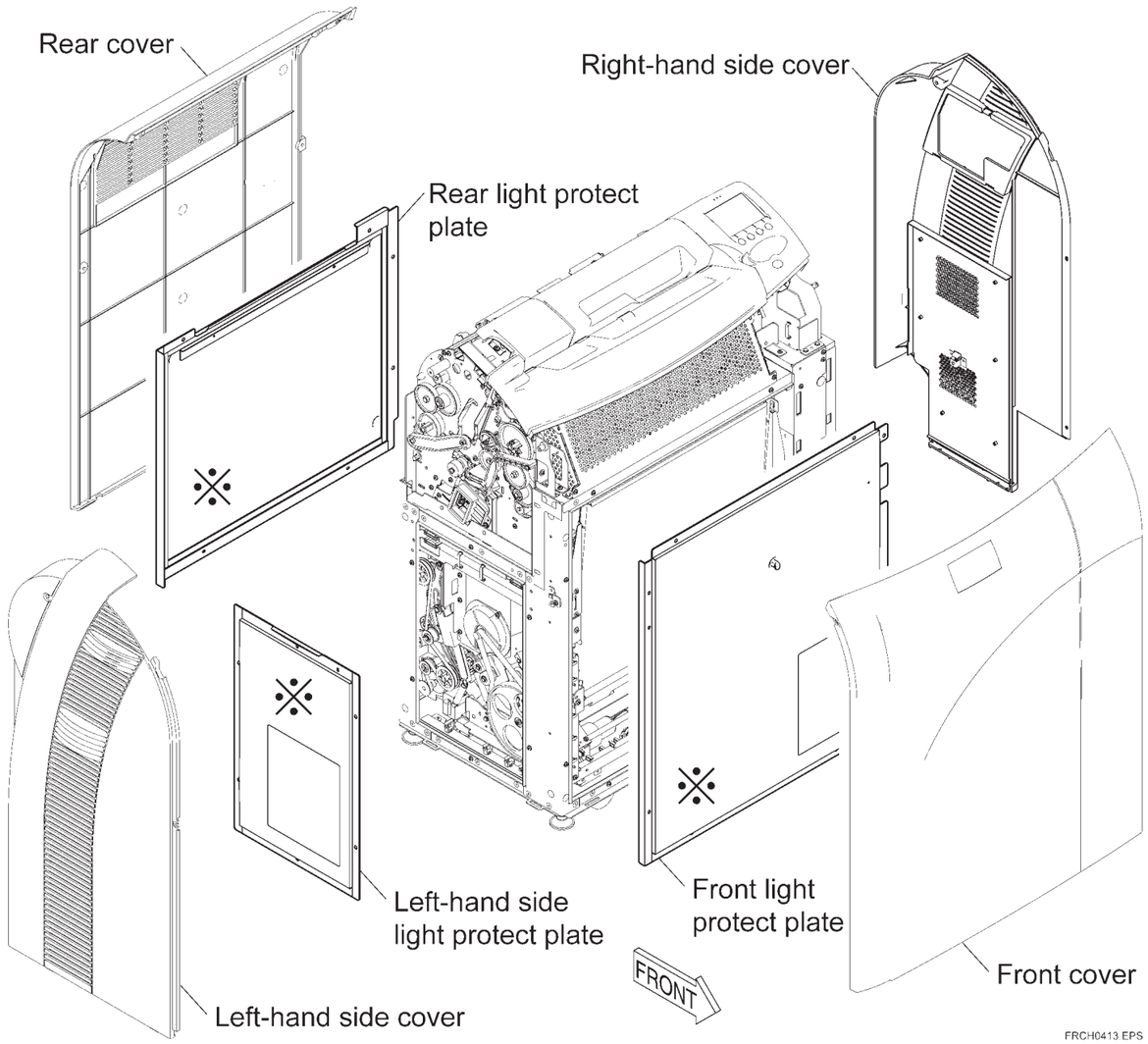
FRCH0426.EPS

3. Protective Housings Against Laser Exposure

Even when the protective housings are removed for servicing, a laser beam will never leak out from the machine unless the optical path is intentionally changed. However, if the optical path is changed inadvertently during optics-related procedures, the service engineer or other people around the machine may be possibly exposed to laser radiation.
During optics-related procedures, carefully perform the procedures while checking the instructions described in this manual, and after the procedures are completed, restore the protective housings removed back exactly where they were.

■ Protective Housing of the Machine

The removable protective housings of the machine are illustrated below. The three covers marked by ∗ in the illustration below are protective housings against laser exposure.



4. CLASSIFICATION

1. **According to the type of protection against electrical shock**
   CLASS 1 EQUIPMENT

2. **According to the degree of protection against electrical shock**
   NO APPLIED PART

3. **Protection against harmful ingress of water**
   IPXO

4. **According to the degree of safety of application in the presence of a flammable anesthetics mixture with air or with oxygen or nitrous oxide.**
   Equipment not suitable for use in the presence of a flammable anesthetics mixture with air or with oxygen or nitrous oxide.

5. **According to the mode of operation**
   CONTINUOUS OPERATION

5. Cautions on Electromagnetic Waves

5.1 Electromagnetic Compatibility (EMC)

This equipment has been tested and found to comply with the limits for medical devices to the IEC60601-1-2 : 1993 (up to 24999), IEC60601-1-2 : 2001 (after 25001), Medical Device Directive 93/42/EEC.

These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to other devices, which can be determined by tuning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures;

- Reorient or relocate the receiving device.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.

Consult the manufacturer or field service technician for help.

5.2 Further information for IEC60601-1-2:2001

Model name CAPSULA X/CARBON X is referred to as CR-IR 357 in this section.

- Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information described as follows.
- Portable and mobile RF communications equipment can affect medical electrical equipment.
- The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by FUJI PHOTO FILM CO., LTD as replacement parts for internal components, may result in increased emissions or decreased immunity of the CR-IR 357.

  List of Cables

Name	Fuji Photo Film Parts code	General Specification
Power Cable	136N0377 (Europe) 136N0376 (UK)	-
I/F Cable	-	TIA/EIA-568 Cat5 or more. Straight cable of UTP type.

- The CR-IR 363 should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the CR-IR 357 should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic emissions		
The CR-IR 357 is intended for use in the electromagnetic environment specified below. The customer or the user of the CR-IR 357 should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The CR-IR 357 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The CR-IR 357 is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The CR-IR 357 is intended for use in the electromagnetic environment specified below. The customer or the user of the CR-IR 357 should assure that it is used in such an environment.			
Immunity test	**IEC 60601test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6kV contact ±8kV air	±2kV contact ±4kV contact ±6kV contact ±2kV air ±4kV air ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV differential mode ±2kV common mode	±1kV differential mode ±2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (>95% dip in U_T) for 0.5 cycle 40 % U_T (60% dip in U_T) for 5 cycles 70 % U_T (30% dip in U_T) for 25 cycles < 5 % U_T (>95% dip in U_T) for 5 s	< 5 % U_T (>95% dip in U_T) for 0.5 cycle 40 % U_T (60% dip in U_T) for 5 cycles 70 % U_T (30% dip in U_T) for 25 cycles < 5 % U_T (>95% dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the CR-IR 357 requires continued operation during power mains interruptions, it is recommended that the CR-IR 357 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The CR-IR 357 is intended for use in the electromagnetic environment specified below. The customer or the user of the CR-IR 357 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150kHz - 80MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the CR-IR 357, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Radiated RF IEC 61000-4-3	3 V/m 80MHz - 2.5GHz	3 V/m	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz - 800 MHz $d = 2.3\sqrt{P}$ 800 MHz - 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strength from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the CR-IR 357 is used exceeds the applicable RF compliance, the CR-IR 357 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the CR-IR 357. [b] Over the frequency range 150 kHz to 80 MHz, field strength should be less than 3 V/m.			

Recommended separation distances between Portable and mobile RF communications equipment and the CR-IR 357

The CR-IR 357 is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the CR-IR 357 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CR-IR 357 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter** m		
	150 kHz - 80 MHz $d = 1.2\sqrt{P}$	**80 MHz - 800 MHz** $d = 1.2\sqrt{P}$	**800 MH - 2.5 GHz** $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

BLANK PAGE